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Date: January 25, 2008 /Jessica Sexton/
Jessica Sexton

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re patent application of: | | | |
| Applicant(s): | Peter Merchant | Examiner: | Seung H. Lee |
| Serial No: | 09/546,962 | Art Unit: | 2876 |
| Filing Date: | April 11, 2000 | | |

Title: PIEZOELECTRIC SCAN SYSTEM

**Mail Stop Appeal Brief-Patents**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, VA 22313-1450**

## REPLY TO ORDER REQUIRING APPELLANT TO BRIEF ADDITIONAL MATTER DATED JANUARY 08, 2008

Dear Sir:

Appellant submits this appeal brief with amended Summary of claimed subject matter to address issues in connection with the above noted order requiring additional matter from the appellant. If any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [TELNP202USA].

**I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))**

The real party in interest in the present appeal is Telxon Corporation, the assignee of the present application.

**II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))**

Appellant, appellant's legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))**

Claims 7, 11, 19, and 22 have been cancelled during prior prosecution. Claims 1-6, 8-10, 12-18, 20-21, and 23 stand rejected by the Examiner. The rejection of claims 1-6, 8-10, 12-18, 20-21, and 23 is being appealed.

**IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))**

No claim amendments have been entered subsequent the Final Office Action.

**V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))**

**A. Independent Claim 1**

Independent claim 1 recites a light source (*See e.g.*, Fig. 2a feature 100 and related text at page 8 lines 17-20), a reflector having an arcuate reflective surface of variable shape (*See e.g.*, Fig. 2b feature 110, 110a, and related text at 9 lines 1-11), and a beam expander (*See e.g.*, Fig. 8 feature 400, and page 14 lines 12-15). The reflector controllably reflects light from the light source and onto the beam expander (*See e.g.*, page 14, lines 15-18). The beam expander in turn reflects at least a portion of the light from the light source onto the target being scanned (*See e.g.*, Fig.8 features 100a, 50a and 50b page 14, lines 15-18). The shape of the reflector is varied to effect a scanning of the target. (*See e.g.*, at page 5 lines 8-9, Fig. 2a, Fig. 2b, surface 110a, light rays 50a, 50b, related text at page 9 lines 1-11).

**B. Independent Claim 15**

Independent claim 15 recites a method for scanning and reading a target. The method includes providing a reflector having a variable arcuate reflective surface (*See e.g.*, Fig. 2a feature 110, Fig. 2b features 110, 110a, and related text at page 9 lines 9-11, lines 23-28), a beam expander (*See e.g.*, Fig. 8 feature 400, and page 14 lines 12-15), and a beam of light from a light source (*See e.g.*, Fig. 8 light source 100 and light ray 100a). Light is then reflected off the reflector and onto the beam expander (*See e.g.*, Fig. 8 light rays from 112a-112b to beam expander 400). In addition, light from the beam expander is reflected onto the target (*See e.g.*, Fig. 8 light rays 50a, 50b). The shape of the reflector is varied to effect a scanning of the target. (*See e.g.*, Fig. 2a, Fig. 2b, surface 110a, light rays 50a and 50b, related text at page 8 line 28 – page 9 line 11 and page 5 lines 5-9).

**C. Independent Claim 21**

Independent claim 21 recites a target scanning apparatus including a housing with an aperture (*See e.g.*, Fig.2a aperture window 26 and related text at page 9 lines 12-14, Fig.7b housing 314, window 320), a scanning circuit (*See e.g.*, Fig.7b piezoelectric reflector 110), and a mirror adapted to reflect scanning light from the scanning circuit through the housing aperture, and onto the target. (*See e.g.*, Fig.7b mirror 300, housing 314, window 320, and piezoelectric reflector 110 related text at page 13 lines 26-28, and page 5 lines 10-14). The reflector controllably reflects light from the light source and onto the beam expander, which in turn reflects light onto the target being scanned (*See e.g.*, Fig.7b and Fig.7c mirror 330, housing 314, window 320, and piezoelectric reflector 110 related text at page 13 lines 26-28, page 14 lines 9-12 and page 5, lines 3-5). The shape of the reflector is varied to effect a scanning of the target. (*See e.g.*, Fig. 2a, Fig. 2b, surface 110a, light rays 50a and 50b, related text at page 8 line 28 – page 9 line 11 and page 5 lines 8-9).

**D. Independent Claim 23**

Independent claim 23 recites a system for scanning and reading a target. The system comprises: means for directing a beam of light (*See e.g.*, Fig. 3a light source 100), means for reflecting at least a portion of the beam of light to the target (*See e.g.*, Fig.3a, feature 111, and related text at page 10 lines 17-24). The system also comprises means for providing movement

in an arcuate piezoelectric material (*See e.g.*, Fig. 3b features 110b, 114a, 114b and related text at page 10 lines 16-23). The means for providing movement changes the shape of the reflecting means which effects scanning of at least a portion of the beam of light across at least a portion of the target. (*See e.g.*, Fig. 3a, Fig. 4a and related text at page 10 line 19 – page 11 line 8, page 5, lines 2-5, page 5 lines 8-9 and page 3 lines 17-23).

The "means for" limitations described above are identified as limitations subject to the provisions of 35 U.S.C. §112 ¶6. The structures corresponding to these limitations are identified with reference to the specification and drawings in the above noted parentheticals.

## VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

**A.** Whether claims 1-6, 8-10, 12-18, 20-21, and 23 are unpatentable under 35 U.S.C. §103(a) over Brobst, *et al.* (US 6,053,409) in view of Tawara (US 5,710,418).

## VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

**A. Rejection of Claims 1-6, 8-10, 12-18, 20-21, and 23 Under 35 U.S.C. §103(a)**

Claims 1-6, 8-10, 12-18, 20-21, and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Brobst *et al*. (US 6,053,409) in view of Tawara (US 5,710,418). Reversal of this rejection is requested for at least the following reasons. Brobst *et al*. and Tawara, either alone or in combination, do not teach or suggest all aspects set forth in the subject claims.

> To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) ***must teach or suggest all the claim limitations***. *See* MPEP §706.02(j). The ***teaching or suggestion to make the claimed combination*** and the reasonable expectation of success ***must be found in the prior art and not based on the Applicant's disclosure***. *See In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

Appellant's claimed invention generally relates to a system and method for scanning and reading bar codes and/or other related symbols, and in particular, to a low-cost, one-dimensional scanner and reader that can be economically implemented on a PC card and/or hand-held scanner. The system employs an electronic scanning and detecting system that can be implemented on a small printed circuit board such as a PCMCIA card or in a hand-held scanning and detecting system. In one aspect of the claimed subject matter the bar code can be analyzed and digitized locally on the PCMCIA card before being sent over a PCMCIA bus to a hand-held or standalone personal computer (PC). Alternatively and/or additionally, the PCMCIA card can convert the analog bar code information and send the information to the PC for appropriate computer analysis and storage. Further, since electronic scanning and receiving systems are employed, the scanning and receiving systems can be applied to small, self-contained, hand-held applications such as may be seen in a check out line. In a further aspect of the claimed subject matter, a uniquely shapeable piezoelectric material can be utilized to provide a non-mechanical, low cost scanning system. More particularly, the subject matter as claimed exploits an arcuate piezoelectric structure that allows for a small, discrete printed circuit board implementation of a one-dimensional bar code scanning and reading system. Additionally, appellant's claimed invention includes a light source for directing a beam of light to a reflector with a piezoelectric material having an arcuate reflective surface for receiving at least a portion of the beam of light, wherein the reflective surface directs at least a portion of the beam of light to a target, and a power source provides movement in a radially-arched piezoelectric material to scan at least a portion of the beam of light across at least a portion of the target, such that at least a portion of the target is reflected onto a photosensor to provide an electrical signal representing the reflected light. To this end, independent claim 1 (and similarly, independent claims 15, 21, and 23) recites: *the reflector reflecting a first portion of the light beam from the light source onto the beam expander, the beam expander reflecting at least a second portion of the first portion of the light beam onto the target, and* ***the shape controlling system selectively varying the shape of the reflector, whereby the second portion scans across at least a portion of the target***. Brobst *et al.* and Tawara, singularly and/or in combination, do not teach or suggest these aspects of the invention as claimed.

Brobst *et al.* relates to imaging systems, and in particular, to a dynamic focusing apparatus for increasing the depth of field of an imaging system, such as an optical scanner.

More specifically, the primary document provides a focus changing apparatus for an optical scanner that increases the depth of field of the optical scanner wherein the focus changing apparatus is optically located between a laser source and a scan mirror and includes a plurality of alternating curved and flat facets, or alternatively, a piezoelectric deformable mirror that is optically located between the laser source and a flat faceted scan mirror to provide for increased depth of field of the optical scanner. The Examiner asserts that the features recited in the subject claims can be located in Figs. 5-8 and col. 5, lines 5-60. Appellants' representative respectfully disagrees. The commentary associated with figures 5-8 makes it clear that the piezoelectric material is employed to increase/decrease the depth of field of the optical scanner, rather than to facilitate generation of a scanning beam. For example, col. 4, lines 55-59, in reference to Fig. 5, states that a laser beam is reflected by a deformable mirror assembly onto *a polygonal scan mirror* which in turn produces *a scanning beam as the polygonal scan mirror rotates*. As further illustration, col. 5, lines 1-4, in reference to Fig. 5A, provides that *the rotating polygonal scan mirror* can be replaced by *an oscillating mirror*, actuated by a motor *for producing the scanning beam.* In yet a further example, col. 5, lines 5-7 discloses that the laser beam is reflected off the deformable mirror assembly, which is selectively deformed to focus the beam at different focal lengths. Thus, the primary document provides a deformable mirror assembly that focuses a beam at disparate focal points wherein a scanning beam is produced by either a rotating polygonal scan mirror or an oscillating mirror. In contrast, appellant's claimed invention provides a shape controlling system that selectively varies the shape of a reflector having an arcuate reflective surface whereby a light beam from a light source can be projected onto a beam expander such that the beam expander reflects the projected light beam onto a target. In other words, the shape controlling system is employed to vary the shape of the reflector such that the light beam, albeit *via* reflection off the beam expander, is projected and traverses across the face of the target. It is submitted that Brobst *et al.* does not teach or suggest this aspect of the recited claim.

Moreover, as the Examiner acknowledges, Brobst *et al.* does not teach or suggest a beam expander with a generally cylindrical reflective outer surface. (*See* Final Office Action dated April 7, 2006, page 3). Thus, in order to cure this deficiency the Examiner offers Tawara. Tawara provides an optical image sensor such as a bar code reader that comprises a laser diode emitting a light beam of small area and elliptical cross-section. The light beam is directed onto

an optical device to expand the beam along one axis to expand the beam cross-section to that of a greatly elongated rectangle having a line-like shape. The line beam is then projected from the reader to encompass and illuminate the entire width of a bar code. Light reflected from the bar code is subsequently focused as a complete image onto a light detector for storage of the bar code data. However, while Tawara makes mention of a cylindrical mirror at col. 5, lines 9-10, the secondary document does not make up for the aforementioned deficiencies with respect to the primary document. More particularly, Tawara does not teach or suggest ***the shape controlling system selectively varying the shape of the reflector, whereby the second portion scans across at least a portion of the target***. Hence, it is submitted, all features recited in the subject claims are not evident in either the primary or secondary documents.

Additionally, the Examiner asserts as grounds for obviousness that it would have been obvious to adapt the teachings of Tawara (*i.e.*, cylindrical body for reflecting the scanning beam) into the system of Brobst *et al.* in order to provide a simple and inexpensive reader by projecting a line laser beam for scanning bar codes. While this may, as the Examiner suggests, be desirous the reality is that this would prove impractical in this instance. As stated *supra*, Tawara provides an optical device such as a circular cone or cylindrical mirror for expanding a beam along one axis so that the beam cross-section becomes an elongated rectangle having a line-like shape. This line beam is then projected from the reader such that the line beam encompasses and illuminates the entire width of a bar code. Appellant's representative conjectures that if generation of such a line beam were to be combined with the apparatus disclosed in Brobst *et al.* that the purpose of Brobst *et al.* (obtaining multiple focal points) would be defeated. Specifically, it is submitted that combining the references as contended would render the system of Brobst *et al.* unsatisfactory as a dynamic focusing apparatus, which increases the depth of field by encompassing different focal points, and as the CAFC has consistently maintained there can be no suggestion or motivation to make the purported modification where the proposed modification would render modified document unsatisfactory for its intended purpose. (*See In re Gordon*, 733 F.2d 900, 902, 221 USPQ1125, 1127 (Fed. Cir. 1984).

In view of the foregoing therefore, it is appellant's representative's belief that the Examiner has employed an insidious 20/20 hindsight road map based analysis to impermissibly provide the missing teaching of the cited document. In essence, the Examiner is basing the rejection on an assertion that it would have been obvious to do something not suggested in the art

based solely on the advantages disclosed in appellants' specification. This sort of rationale has been condemned by the Court of Appeal for the Federal Circuit as being sophistic. (*See e.g. Panduit Corp. v. Dennison Manufacturing Co.*, 1 USPQ2d 1593 (Fed. Cir. 1987)). Thus it is submitted, a *prima facie* case of obviousness has not been established against appellant's claimed invention. Further, the subject invention would not have been obvious to one ordinarily skilled in the art sufficient to impel him/her to do what the appellants have suggested, other than *via* employment of appellant's specification as a 20/20 hindsight-based road map to achieve the purported invention. Accordingly, reversal of this rejection with respect to independent claims 1, 15, 21, and 23 (and associated dependent claims) is respectfully requested.

**B. Conclusion**

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1-6, 8-10, 12-18, 20-21, and 23 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [TELNP202USA].

Respectfully submitted,
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**VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))**

1. A system for scanning a target, comprising:
a light source providing a light beam;
a reflector having an arcuate reflective surface with a variable shape;
a shape controlling system for controlling the shape of the reflector;
a beam expander with a generally cylindrical reflective outer surface; and
the reflector reflecting a first portion of the light beam from the light source onto the beam expander, the beam expander reflecting at least a second portion of the first portion of the light beam onto the target, and the shape controlling system selectively varying the shape of the reflector, whereby the second portion scans across at least a portion of the target.

2. The system of claim 1, further including a photo sensor, wherein the target reflects at least a portion of the second portion of light onto the photo sensor and the photo sensor generates an electrical signal representative of the at least a portion of the second portion of light.

3. The system of claim 1, the reflector includes a piezoelectric material with an arcuate reflective surface.

4. The system of claim 1, the shape of the reflector is generally radial.

5. The system of claim 1, the shape controlling system provides a voltage signal to the piezoelectric material, and the shape of the reflector is varied according to the voltage signal.

6. The system of claim 5, the shape of the reflector is generally radial.

7. (Canceled)

8. The system of claim 6, the beam expander has a generally spherical reflective outer surface.

9. The system of claim 6, the beam expander includes a convex arcuate reflective surface.

10. The system of claim 1, the beam expander includes a convex arcuate reflective surface.

11. (Canceled)

12. The system of claim 6, further including a photo sensor, wherein the target reflects at least a portion of the second portion of light onto the photo sensor and the photo sensor generates an electrical signal representative of the at least a portion of the second portion of light.

13. The system of claim 12, further including a conversion and interface system receiving the electrical signal from the photo sensor and converting the electrical signal to a digital code.

14. The system of claim 2, further including a conversion and interface system receiving the electrical signal from the photo sensor and converting the electrical signal to a digital code.

15. A method of scanning a target, comprising the steps of:

providing a reflector having an arcuate reflective surface with a variable shape;

providing a beam expander with a cylindrical reflective outer surface;

providing a light beam from a light source to the reflector;

reflecting a first portion of the light beam off of the reflector and onto the beam expander;

reflecting a second portion of the light beam off of the beam expander and onto the target; and

varying the shape of the reflector, thereby scanning at least a portion of the target with the second portion of the light beam.

16. The method of claim 15, further including providing a control system with a control signal, wherein the shape of the reflector varies according to the control signal.

17. The method of claim 16, the reflector includes a piezoelectric material having at least two electrodes, and said shape varies according to the voltage across said electrodes.

18. The method of claim 16, the beam expander includes a convex arcuate reflective surface.

19. (Canceled)

20. The method of claim 15, the beam expander has a generally cylindrical reflective outer surface.

21. A target scanning apparatus, comprising:

a housing having generally horizontal top and bottom sides, generally vertical left and right sides, the sides extending longitudinally between generally vertical front and rear ends;

a scanning system mounted in the housing and having a reflector with a variable shape arcuate convex reflective surface, a light source providing a light beam to the reflector, and a control system adapted to control the shape of the reflector;

a cylindrical reflective surface displaced from the reflector in the housing near one of the front and rear ends; and

an aperture in one of the sides near the one of the front and rear ends;

the reflector reflecting a first portion of the light beam onto the cylindrical reflective surface which is oriented so as to reflect a second portion of the light beam from the reflector through the aperture and onto the target, and the control system varying the shape of the reflector whereby the second portion of the light beam scans at least a portion of the target, whereby the light beam is expanded.

22. (Canceled)

23. A system for scanning a target, comprising:

means for providing a light beam;

reflector means for reflecting a first portion of the light beam;

expander means for reflecting a second portion of the light beam from the reflector means onto the target, the expander means comprising a polished round pillar having a cylindrical reflective outer surface; and

means for varying the shape of the reflector means, by which at least a portion of the target is scanned with the second portion of the light beam.

## IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

## X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.